

Decidual Vasculopathy -A Revisit Of Underdiagnosed Entity

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Abstract

Background :

Decidual vasculopathy (DV), also known as decidual arteriopathy or decidual arteriolopathy, refers to a number of lesions involving uteroplacental vessels, like persistence of arteriolar smooth muscle, intimal accumulation of foamy macrophages (atherosis), fibrinoid degeneration, necrosis, lymphocytic or plasmacytic decidual vasculitis, and thrombosis. Recent studies have suggested that the extent of lesion correlates to the severity of the clinical manifestation of preeclampsia and the ischemic lesions that result from uteroplacental malperfusion and are associated with diminished fetal growth and adverse outcome.

There is also debate about what areas to be grossed on placenta for histopathologic sections, and if additional special sections are needed to find them.

In this study we reviewed and analysed the locations of placental histopathological examination for the decidual vasculopathy and need for further sections in demonstrating it.

Materials and methods: Its a three year prospective study from June 2016 to June 2019 done at Modern Government Maternity Hospital, Osmania Medical college, Koti, Hyderabad. A total of 72 patients diagnosed with eclampsia and pre eclampsia were further evaluated and operated in the Department of Obstetrics and Gynaecology. All the gross specimens of placenta were received in the Department of Pathology. They were processed sectioned from various areas of placenta and stained with routine Haematoxylin and Eosin and further evaluated under microscope.

Results : Of the 72 cases analysed, clinical diagnosis of preeclampsia and eclampsia was seen in 58 cases (80.5%) 9 cases (12.5%) were of preterm ie 18- 33 weeks of gestation and 5 cases (6.9%) of IUGR were observed. Decidual vasculopathy was identified in 51 cases (87.9%) of maternal malperfusion and 9 cases (15.5%) had feature of vasculopathy in one of the location only. Ischemic changes were identified in 33 placentas (56.8%), 12 placentas had infarcts (20.4%), and 2 placentas had retroplacental hematomas (3.4%) There was no association between the presence of ischemic change and specific location of decidual vasculopathy.

Conclusion: Decidual vasculopathy was found most frequently in the Membrane roll sections compared with Full Thickness and Basal plate. In 9.2% of cases, Decidual vasculopathy was found only in the extra sections of Basal plate.

Keywords: Decidual vasculopathy, placenta, membrane roll, basal plate, maternal malperfusion

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I. Introduction

Examination of placenta in pregnancies with complications such as pre-eclampsia, toxemia of pregnancy (PET) or intrauterine growth restriction (IUGR) provides insight into specific diagnoses, recurrence risk and chronicity of disorders.¹ In patients with preeclampsia, unremodeled spiral arteries develop pathological changes, termed decidual vasculopathy (DV), or acute atherosclerosis. DV has been correlated to adverse clinical outcome and increased placental pathology.² There are three morphological types of decidual vasculopathy, namely acute atherosclerosis, fibrinoid medial necrosis, and mural arterial hypertrophy. These morphological features could represent the various stages of the same pathological process.³ Although some have advocated submitting special sections in order to better document DV, it is unclear which placental sections have the highest yield in demonstrating these abnormal vessels.⁴ Often, these abnormal vessels are difficult to identify on gross examination particularly in the decidua basalis where physiologic conversion is expected. There is also debate about what areas to be grossed on placenta for histopathologic sections, and if additional special sections are needed to find them.

In this study we reviewed and analysed the locations of placental histopathological examination for the decidual vasculopathy and need for further sections in demonstrating it. This study was done to identify

placental vasculopathy in the placentas of maternal malperfusion cases and to stratify the various features of Decidual vasculopathy and significance of placental grossing examination .

II. Materials and methods

Its a three year study from June 2016 to June 2019 done at Modern Government Maternity Hospital,Osmania Medical college ,Koti,Hyderabad.

Study Design: Prospective study

Study Location: This was a tertiary care teaching hospital based study done in Department of Pathology , Modern Government Maternity Hospital,Osmania Medical college ,Koti,Hyderabad.

Duration: November 2016 to November 2019.

Sample size: 72 cases.

Inclusion criteria:

All cases of Eclampsia and Preeclampsia

Exclusion criteria:

Antenatal cases other than eclampsia and pre eclampsia.

Procedure methodology

A written informed consent was obtained from patients . Patients diagnosed with eclampsia and pre eclampsia were further evaluated and operated in the Department of Obstetrics and Gynaecology. All the gross specimens of placenta were received in the Department of Pathology in 10% of Neutral Buffered formalin solution. The sections were sampled from umbilical cord (from different areas of the cord), 2 section of Membrane roll 2 Full Thickness sections of placental parenchyma from the central portion of the placental disc, and 2 sections of maternal surface after proper fixation. They were processed and stained with routine Haematoxylin and Eosin and further evaluated under microscope. Each case was reviewed by 2 pathologists to confirm the original diagnosis of Decidual vasculopathy and to determine in which sections the lesions were present.

Decidual vasculopathy was defined as the presence of any of the following criteria:

Persistence of arteriolar smooth muscle,

atherosis, fibrinoid degeneration or necrosis,

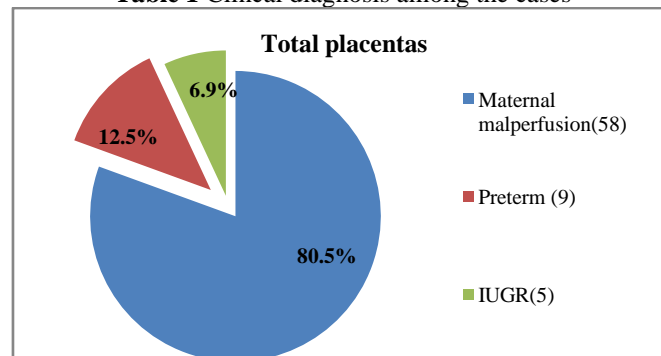
lymphocytic or plasmacytic decidual vasculitis, or thrombosis.

The presence of ischemic change, specifically increased syncytial knots, accelerated villous maturity , villous agglutination, infarcts, and retroplacental hematomas were also observed.

III. Results

Of the 72 cases analysed ,clinical diagnosis of preeclampsia and eclampsia was seen in 58 cases (80.5%) 9 cases (12.5%) were of preterm ie 18- 33 weeks of gestation and 5 cases (6.9%) of IUGR were observed

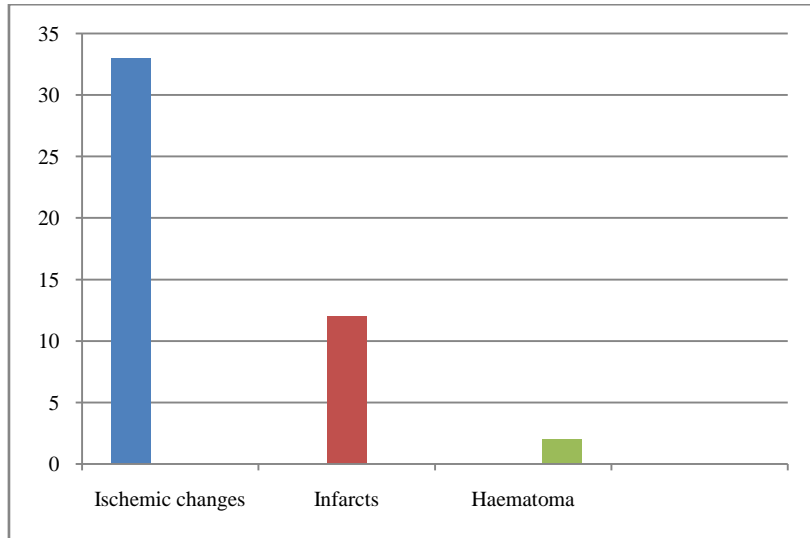
Table 1 Clinical diagnosis among the cases



Decidual vasculopathy was identified in 51 cases(87.9%) of maternal malperfusion and 9 cases (15.5%) had feature of vasculopathy in one of the location only .

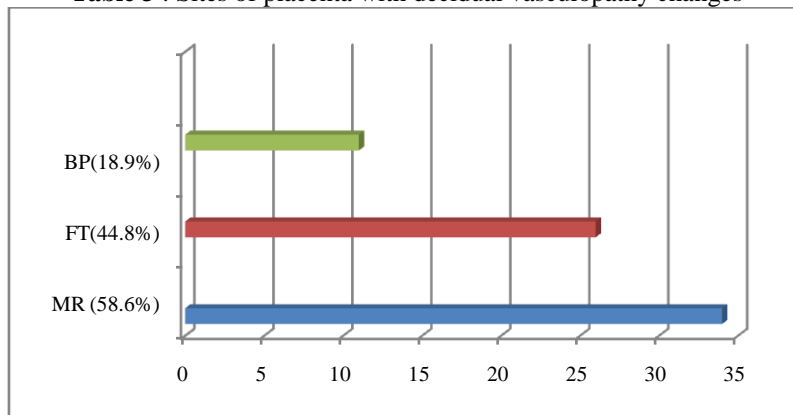
Ischemic changes were observed in 33 placentas (56.8%), 12 placentas had infarcts (20.4%), and 2 placentas had retroplacental hematomas(3.4%).

Table2 Ischemic changes

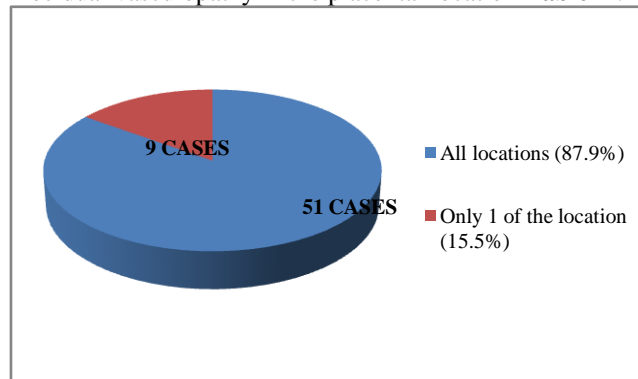


From the various sections of placentas studied, Decidual vasculopathy was seen in MR Membrane Roll sections of 34(58.6%) placenta, FT full thickness sections of 26 (44.8%) and BP basal plate sections in 11(18.9%) .

Table 3 : Sites of placenta with decidual vasculopathy changes



Distribution of Decidual vasculopathy in the placental location **Table 4 :** Placental location



Of these 9 cases which showed decidual vasculopathy in only one location of placenta, extra sections were given from the basal plate so as to target the uteroplacental vessels. These sections showed the characteristic decidual vasculopathy lesions. Histopathological findings include

Figure 1 :Haematoxylin and eosin section low power 10 x -Smooth muscle hypertrophy

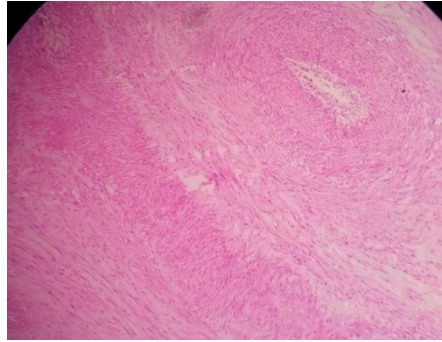


Figure 2 :Haematoxylin and eosin section low power 10 x -Atheroma

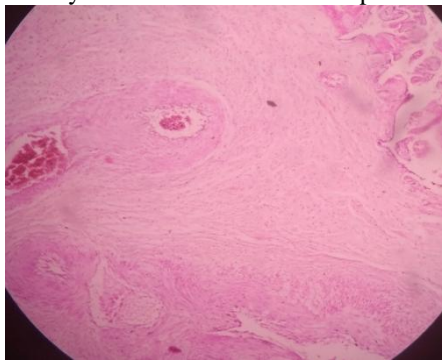


Figure 3 :Haematoxylin and eosin section low power 10 x –Fibrinoid necrosis

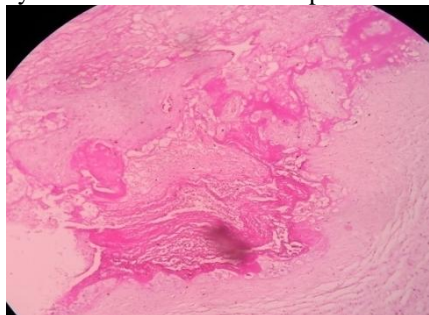
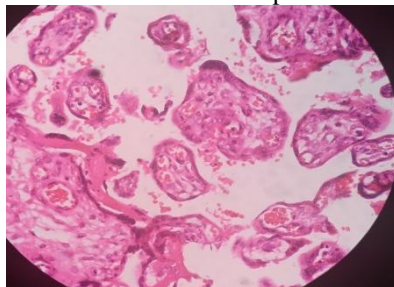


Figure 4 :Haematoxylin and eosin section low power 10 x –Villous agglutination



IV. Discussion

The frequently encountered lesion in severe cases of preeclampsia is decidual vasculopathy, or acute atherosclerosis, of maternal spiral arteries. This intriguing lesion has caught the attention of many pathologists since its first description by Hertig et al., in 1945⁶

Current pathology laboratory grossing recommendations do not recommend sections specifically examining uteroplacental vessels. Decidual vasculopathy has been shown to be associated with histologic features of ischemic change, villous infarction, as well as retroplacental hematomas. However, the relationship between the location of Decidual vasculopathy and these lesions has not been much studied

In the setting of preeclampsia (PE), decidual vasculopathy (DV) can be seen along the free membranes⁵

Although it is advocated submitting special sections in order to identify Decidual vasculopathy, it still difficult as to which placental sections have the highest yield in demonstrating these abnormal vessels.⁴

Joanna Chan et al reviewed the membrane roll (MR), full thickness (FT) sections of the placental disc, and sections specifically of the basal plate (BP). Decidual Vasculopathy was found in the MR in 67.1% of cases, in FT sections in 32.9%, and in the BP in 25.0% of cases (P value = .004). Decidual Vasculopathy was exclusive to the MR in 53.9%, the FT in 14.5%, and the BP in 9.2%. DV was present in 2 locations in 19.7% and in all 3 locations in 2.6%. The presence of DV in any location (MR, FT, and BP) was associated with placental ischemic change but not specifically with infarcts or retroplacental hematomas.

In this study, we found that while Decidual vasculopathy can be diagnosed in multiple locations within the placenta (75% of the placentas examined). It was isolated to only 1 of the locations in 15% of cases. In 18.9% of the placentas lesion was exclusive to Basal Plate sections.

Therefore, the lack of routine focused inspection on uteroplacental lesions may lead to an under diagnosis of Decidual vasculopathy as in our 15% of placentas that would be now presumed to have Decidual vasculopathy

Decidual Vasculopathy was found most frequently in the Membrane roll sections compared with Full Thickness and Basal plate. Furthermore, in 9 cases(15.5%), DV was found only in the extra sections of Basal plate.

For cases in which the clinical history suggests potential for the presence of Decidual vasculopathy, such as preeclampsia, there are no protocols or specific recommendations on what sections to take, how many, and from what location.

These lesions translate into clinical outcome depending on the number of vessels affected, their location and their morphological characteristics. A “milder” degree of spiral artery damage will translate to only mild hypertensive disorder or even normal pregnancy, whereas severe lesions will manifest into severe early preeclampsia, fetal growth restriction or even fetal death⁷

V. Conclusion

Although Decidual vasculopathy is frequently present in the Membrane roll, extra sections of Basal plate specifically designed to identify Decidual Vasculopathy is recommended, particularly in any placenta with a clinical history suggestive of maternal malperfusion. Proper identification of the abnormal vessels on gross examination with minimum recommended sections particularly from basal plate can fulfill the diagnostic criteria of Decidual vasculopathy, inturn helping the gynaecologists and the genetic counsellors to prepare mothers for future pregnancies with good fetal outcome.

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